Active suspension system in improving ride and handling performance of electric vehicle conversion

Abstract

This paper presents an evaluation on passenger vehicle's ride and handling performance when converted into an electric vehicle (EV). The evaluations were done using a validated 14 degrees of freedom ride and handling model. The mathematical modelling of vehicle's ride and handling model as well as its validations are described. Two types of experiments were performed to validate the developed simulation model; the ride test and the handling test. The validated simulation model was used to evaluate the vehicle's ride and handling performance of the vehicle when converted into an electric vehicle. The evaluation involves two weight distribution ratios which are 60:40, for normal vehicle and 40:60 for EV conversion. The validated simulation model used active suspension system in order to improve the EV conversion's ride and handling performance. It is found that modification into EV affects vehicle's handling performance quite significant but not ride performance. The EV conversion's weight, which is distributed towards the rear of the vehicle, causes the vehicle to travel off from its original travelling path. The application of active suspension system is proposed to improve EV conversion's handling performance as well as its ride comfort performance.